## AMENDMENTS TO THE CLAIMS

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| 1. (Original): | Claim filed with the application following the specification (i.e., not added by preliminary amendment). |
| 2. (Currently amended): | Claim being amended in the current amendment paper. |
| 3. (Previously presented): | Claim not being currently amended, but which was amended in a previous amendment paper, or Claim added in an earlier amendment paper. |
| 4. (Cancelled): | Claim cancelled or deleted from the application. |
| 5. (Withdrawn): | Claim still in the application, but in a non-elected status. |
| 6. (New): | Claim being added in the current amendment paper. |
| 7. (Not entered) | Claim presented in a previous unentered amendment. Do not present the text of a not entered claim. Consecutive not entered claims may be grouped together (e.g., Claims 20-25 (not entered)). If in doubt as to whether a prior amendment was entered, the claim should be presumed to be "not entered". |

1. (Original) A cross-flow ion mobility system for separating ions according to ion mobilities of charged particles and charged particles derived from atoms, molecules, particles, sub-atomic particles and ions, said system comprised of:

at least two electrodes disposed so as to create an electric field therebetween; and

a first fluid flow that is substantially in opposition to the electric field.

2. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the first fluid flow is comprised of a gas.

3. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the first fluid flow is comprised of a liquid.

4. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the at least two electrodes are at least partially permeable to the first fluid flow.

5. (Original) The cross-flow ion mobility system as defined in claim 4 wherein the at least two electrodes are selected from the group of electrodes comprised of at least two concentric cylinders, at least two concentric spheres, a plurality of stacked plates, at least two substantially parallel plates, and at least two substantially non-parallel plates.

6. (Original) The cross-flow ion mobility system as defined in claim 5 wherein the at least two concentric cylinders are further comprised of a first cylinder and a second cylinder, wherein a gap between the first cylinder and the second cylinder defines a gas cross-flow region.

7. (Original) The cross-flow ion mobility system as defined in claim 6 wherein the first cylinder and the second cylinder include a plurality of apertures therethrough, wherein the plurality of apertures enable a gas cross-flow to pass from inside the first cylinder, through the gas cross-flow region, and out through the second cylinder.

8. (Original) The cross-flow ion mobility system as defined in claim 7 wherein the system is further comprised of an end cap that is coupled to a first end of the first cylinder and the second cylinder, wherein the end cap creates a seal at the first end that functions as an entry for ions to be delivered to the gas cross-flow region.

9. (Original) The cross-flow ion mobility system as defined in claim 8 wherein the end cap is further comprised of an inlet aperture disposed in an end thereof, wherein the inlet aperture receives ions to be delivered to the gas cross-flow region.

10. (Original) The cross-flow ion mobility system as defined in claim 7 wherein the system is further comprised of a detector.

11. (Original) The cross-flow ion mobility system as defined in claim 10 wherein the detector is disposed at a second end of the first cylinder and the second cylinder, opposite the end cap.

12. (Original) The cross-flow ion mobility system as defined in claim 11 wherein the detector is selected from the group of detectors comprised of a Faraday detector, electron multiplier, multi-channel plate, a mass spectrometer, another ion mobility analyzer, an array detector and a charge-coupled detector.

13. (Original) The cross-flow ion mobility system as defined in claim 12 wherein the system further comprises a housing, wherein the first cylinder and the second cylinder are disposed within the housing to thereby control fluid flow therein.

14. (Original) The cross-flow ion mobility system as defined in claim 13 wherein the first fluid flow is through the gas cross-flow region.

15. (Original) The cross-flow ion mobility system as defined in claim 14 wherein the system is further comprised of a second fluid flow, wherein the second fluid flow is substantially perpendicular to the first fluid flow, and wherein the second

fluid flow is generally parallel to a long axis of the first cylinder and the second cylinder.

16. (Original) The cross-flow ion mobility system as defined in claim 15 wherein the system is further comprised of an ion source, wherein the ion source is disposed adjacent to the inlet aperture for delivery of ions thereto.

17. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the system is further comprised of a voltage source, wherein the voltage source is coupled to the at least two electrodes to thereby enable creation of the electric field.

18. (Original) The cross-flow ion mobility system as defined in claim 16 wherein the housing further comprises an air tight seal such that the system can operate at an elevated pressure, at atmospheric pressure, or at reduced pressure.

19. (Original) The cross-flow ion mobility system as defined in claim 18 wherein the housing further comprises an insulated device, wherein the system can operate at an elevated temperature, at room temperature, and at a reduced temperature.

20. (Original) The cross-flow ion mobility system as defined in claim 19 wherein the system is further comprised of means for increasing and decreasing a velocity of the first fluid flow.

21. (Original) The cross-flow ion mobility system as defined in claim 20 wherein the system is further comprised of a means for increasing and decreasing a velocity of the second fluid flow.

22. (Original) The cross-flow ion mobility system as defined in claim 21 wherein the system is further comprised of a means for increasing and decreasing an electric potential on the at least two electrodes, whereby the electric field can be increased and decreased.

23. (Original) The cross-flow ion mobility system as defined in claim 2 wherein the gas of the first fluid flow is selected from the group of gases comprised of inert gases.

24. (Original) The cross-flow ion mobility system as defined in claim 2 wherein the gas of the first fluid flow is selected from the group of gases comprised of modifying gases, wherein, a modifying gas is a gas in which the transport properties of ions have been changed.

25. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the system is further comprised of means for analyzing ions, wherein the means for analyzing includes the ability to enable the system to only pass at least one ion of a known mobility.

26. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the system is further comprised of means for measuring ions, wherein the means for measuring includes the ability to scan through a range of ion mobilities, select a particular ion mobility peak, and relate the selected ion mobility peak to gas cross-flow velocity and the opposing electric field.

27. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the system further comprises means for generating a high electric field asymmetric waveform.

28. (Original) The cross-flow ion mobility system as defined in claim 15 wherein the system further comprises a new fluid flow, wherein the net fluid flow is the combination of the first fluid flow and the second fluid flow.

29. (Original) The cross-flow ion mobility system as defined in claim 1 wherein the system also performs chemical and physical analysis, said system further comprising:

a means for introducing ions from a sample to the cross-flow ion mobility system;

a means for detecting the ions from the sample;

a means for obtaining a measure of selected ion mobilities from the sample; and

a means for relating the measure of selected ion mobilities from the sample to a chemical identity or at least one physical property.

30. (Original) A method for separating ions according to ion mobilities of charged particles and charged particles derived from atoms, molecules, particles, sub-atomic particles and ions, said system comprised of:

1) providing a cross-flow ion mobility system comprised of at least two electrodes disposed so as to create an electric field therebetween, and a first fluid flow that is substantially in opposition to the electric field; and

2) separating ions based upon charge, size and cross-sectional area of the ions.

31. (Original) The method as defined in claim 30 wherein the method further comprises the step of creating the first fluid flow from a gas.

32. (Original) The method as defined in claim 30 wherein the method further comprises the step of creating the first fluid flow from a liquid.

33. (Original) The method as defined in claim 30 wherein the method further comprises the step of making the at least two electrode at least partially permeable to the first fluid flow to thereby enable the creation of a fluid cross-flow in the system.

34. (Original) The method as defined in claim 33 wherein the method further comprises the step of selecting the at least two electrodes from the group of electrodes comprised of at least two concentric cylinders, at least two concentric spheres, a plurality of stacked plates, at least two substantially parallel plates, and at least two substantially non-parallel plates.

35. (Original) The method as defined in claim 34 wherein the method further comprises the steps of:

1) selecting a first and a second concentric cylinders as the at least two electrodes; and

2) defining a gap between the first cylinder and the second cylinder as a gas cross-flow region wherein the ions are separate according to ion mobilities.

36. (Original) The method as defined in claim 35 wherein the method further comprises the steps of creating a plurality of apertures through the first cylinder and the second cylinder to thereby enable a gas cross-flow to pass from inside the first cylinder, through the gas cross-flow region, and out through the plurality of apertures in the second cylinder.

37. (Original) The method as defined in claim 36 wherein the method further comprises the step of coupling an end cap to a first end of the first cylinder and the second cylinder, wherein the end cap creates a seal at the first end that functions as an entry for ions to be delivered to the gas cross-flow region.

38. (Original) The method as defined in claim 37 wherein the method further comprises the step of disposing an inlet aperture in an end thereof, wherein the inlet aperture receives ions to be delivered to the gas cross-flow region.

39. (Original) The method as defined in claim 38 wherein the method further comprises the step of providing an ion detector.

40. (Original) The method as defined in claim 39 wherein the method further comprises the step of disposing the detector at a second end of the first cylinder and the second cylinder, opposite the end cap.

41. (Original) The method as defined in claim 40 wherein the method further comprises the step of selecting the detector from the group of detectors comprised of a Faraday detector, electron multiplier, multi-channel plate, a mass spectrometer, an ion mobility analyzer, an array detector and a charge-coupled detector.

42. (Original) The method as defined in claim 41 wherein the method further comprises the step of disposing a housing around the first cylinder and the second cylinder to thereby control fluid flow therein.

43. (Original) The method as defined in claim 42 wherein the method further comprises the step of directing the first fluid flow through the gas cross-flow region.

44. (Original) The method as defined in claim 43 wherein the method further comprises the step of providing a second fluid

flow that is substantially perpendicular to the first fluid flow, and wherein the second fluid flow is generally parallel to a long axis of the first cylinder and the second cylinder.

45. (Original) The method as defined in claim 44 wherein the method further comprises the step of providing an ion source, wherein the ion source is disposed adjacent to the inlet aperture for delivery of ions thereto.

46. (Original) The method as defined in claim 30 wherein the method further comprises the step of providing a voltage source, wherein the voltage source is coupled to the at least two electrodes to thereby enable creation of the electric field.

47. (Original) The method as defined in claim 45 wherein the method further comprises the step of making an air tight seal for the housing such that the system can operate at an elevated pressure, at atmospheric pressure, or at reduced pressure.

48. (Original) The method as defined in claim 47 wherein the method further comprises the step of insulating the housing such that the system can operate at an elevated temperature, at room temperature, and at a reduced temperature to thereby alter ion mobilities.

49. (Original) The method as defined in claim 48 wherein the method further comprises the step of providing means for increasing and decreasing a velocity of the first fluid flow to thereby alter ion mobilities.

50. (Original) The method as defined in claim 49 wherein the method further comprises the step of providing means for increasing and decreasing a velocity of the second fluid flow.

51. (Original) The method as defined in claim 50 wherein the method further comprises the step of providing means for increasing and decreasing an electric potential on the at least two electrodes, whereby the electric field can be increased and decreased to thereby alter ion mobilities.

52. (Original) The method as defined in claim 51 wherein the method further comprises the step of selecting the first fluid flow from the group of gases comprised of inert gases.

53. (Original) The method as defined in claim 52 wherein the method further comprises the step of selecting the first fluid flow from the group of gases comprised of modifying gases,

wherein, a modifying gas is a gas in which the transport properties of ions have been changed.

54. (Original) The method as defined in claim 53 wherein the method further comprises the step of providing means for analyzing ions, wherein the means for analyzing includes the ability to enable the system to only pass at least one ion of a known mobility.

55. (Original) The method as defined in claim 54 wherein the method further comprises the steps of:

1) providing means for measuring ions;

2) scanning through a range of ion mobilities;

3) selecting a particular ion mobility peak; and

4) relating the selected ion mobility peak to gas cross-flow velocity and the opposing electric field.

56. (Original) The method as defined in claim 30 wherein the method further comprises the step of performing chemical and physical analysis on a sample.

57. (Original) The method as defined in claim 56 wherein the method further comprises the steps of:

1) introducing ions from a sample to the cross-flow ion

mobility system;

2) detecting the ions from the sample;

3) obtaining a measure of selected ion mobilities from the sample; and

4) relating the measure of selected ion mobilities from the sample to a chemical identity or at least one physical property.

58. (Original) The method as defined in claim 56 wherein the method further comprises the step of detecting a wide range of chemicals selected from the group of chemicals comprised of pharmaceuticals, environmental pollutants, chemical and biological warfare agents, agrichemicals, explosives and petrochemicals.

59. (Original) The method as defined in claim 56 wherein the method further comprises the step of characterizing sizes of lipo-proteins from blood samples.

60. (Original) The method as defined in claim 30 wherein the method further comprises the step of maintaining a balance as an ion travels through the gas cross-flow region so that an ion that is in balance when entering the gas cross-flow region is not rejected because the electric field changes.

61. (Original) The method as defined in claim 60 wherein the method further comprises the step of arranging the at least two electrodes so that at any given time the electric field for an ion near an exit point of the gas cross-flow region is less than for an ion near an entry point of the gas cross-flow region when scanning from low to high voltage.

62. (Original) The method as defined in claim 61 wherein the method further comprises the step of arranging the at least two electrodes so that at any given time the electric field for an ion near an exit point of the gas cross-flow region is greater than for an ion near an entry point of the gas cross-flow region when scanning from high to low voltage

63. (Original) The method as defined in claim 62 wherein the method further comprises the step of creating a desired voltage gradient by dividing the at least two electrodes into a plurality of discrete sections.

64. (Original) The method as defined in claim 63 wherein the method further comprises the step of creating a desired voltage gradient by using non-parallel electrodes.

65. (Original) The method as defined in claim 64 wherein the method further comprises the step of making a gas cross-flow velocity lower at the exit point than at the entry point when scanning from a low to a high voltage.

66. (Original) The method as defined in claim 65 wherein the method further comprises the step of making a gas cross-flow velocity higher at the exit point than at the entry point when scanning from a high to a low voltage.